



# Women's emotional roller coasters during pregnancy as a consequence of infertility: a qualitative phenomenological study

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## Abstract

Women experiencing infertility tend to experience distinct emotions during pregnancy following infertility. Individuals in this population often struggle with psychological and social challenges during pregnancy. This qualitative phenomenological study determines how infertility experiences affect mothers' mental well-being during pregnancy as well as their experiences and emotions after becoming pregnant. A face-to-face, in-depth interview with 15 women with infertility was conducted between November 2022 and May 2023. The study adhered to ethical guidelines, with informed written consent obtained prior to interviews and voice recordings. The COREQ checklist is applied to follow the EQUATOR guidelines for reporting research and the data were coded using MAXQDA.20 software. A thematic analysis revealed four main themes and 15 codes. Main themes included "Over Emotional Burden," "Overprotection," "Overthinking," and "Social Activity Changes." Pregnancy after infertility is a unique and emotionally charged experience for women, encompassing a spectrum of feelings that can be difficult to express. The importance of caring for these women and receiving support from their partners, families, and healthcare providers should not be overstated. Healthcare providers should be aware of these emotional challenges so they can provide better support and counselling to improve women's overall pregnancy experience. It is believed that empathetic communication and tailored support can significantly improve the psychological well-being of this population. Psychologists, psychiatrists, and midwives should also be more attentive to mothers' emotional challenges and integrate comprehensive emotional support and provide coping mechanisms in perinatal care programs.

**Keywords** Infertility (MeSH D007246) · Pregnancy (MeSH D011247) · Qualitative research (MeSH D036301) · Mental health (MeSH D008603) · Fertility (MeSH D005298)

## Introduction

Infertility has been a prevalent health problem in recent generations around the world (Fainberg & Kashanian, 2019). Couples with infertility generally struggle with

socioeconomic, psychological, physical, and cultural consequences of this condition (Kianfar et al., 2023). Based on statistical analysis, 10–15% of the world's population experience infertility (Bakhtiyar et al., 2019). This condition is considered a severe disability and ranks fifth in severity. Considering the causes and duration of infertility, it may significantly affect a couple's psychological well-being (Borumandnia et al., 2022). According to the literature, nearly half of women seeking infertility treatments struggle with disorders aligned with posttraumatic stress disorder. Researchers have also noted that infertility concerns impair coping mechanisms in individuals which result in considerable stress and anxiety among infertile couples (Renzi et al., 2023b). Nowadays, infertility procedure is often suggested as a double-edged sword that can cause considerable emotional distress, social stigma, and financial concerns in couples (Taebi et al., 2021). According to the literature, infertility treatment processes mainly affect women more

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than men, and infertile women are considered deficient women in some cultures and societies (Olma & Bir, 2018; Yao et al., 2018). According to a literature, the better quality of life of couples is strongly associated with more success rates in infertility treatments. It also appears that decreased psychological symptoms as well as enhanced emotion regulation abilities may contribute to improved success rates in treatment centers (Renzi et al., 2023a). Pregnancy after infertility can be a unique and emotionally inspiring experience for infertile couples. However, even after achieving a successful pregnancy, women who have experienced infertility may struggle with psychological and social challenges during pregnancy and after childbirth (Crespo & Bestard, 2016). Studies have shown that women who get pregnant after infertility experience some levels of stress and anxiety regarding their fetal and maternal outcomes. Their pregnancy may also result in confusing feelings between excitement and grief (Maehara et al., 2022). In the first trimester, the infertile woman often struggles with fears of pregnancy loss, possible fetal abnormalities, and adapting to significant physical changes (Dornelles et al., 2016). During the third trimester, anxiety and stress can be caused by the fear of pregnancy complications and preterm labor. Furthermore, infertile women may face challenges in selecting a safe delivery method (Huang et al., 2019). According to the literature, there is considerable research on mental health before and after pregnancy in infertile couples (McMahon et al., 2011).

In this qualitative study, we aim to investigate how infertility experiences affect mothers' mental well-being during pregnancy as well as their perspectives and feelings after becoming pregnant.

## Methods

### Study design

This research is a qualitative study with a Heideggerian, hermeneutic phenomenological approach. This study was framed by Heideggerian phenomenology, and its Heideggerian influence extends throughout the entire study. In this approach, personal experience and the interpretation of events is emphasized as significant components of understanding human cognition and behavior (Heidegger, 1996). As a method of studying human experience, hermeneutic phenomenology has the unique potential of being able to examine complex phenomena in depth. Methodologies like this are well suited for representing the depth and complexity of individual experiences, providing detailed context to understand the complex interaction of factors influencing individuals' life experiences (Plager, 1994). All in all,

this study uses hermeneutic phenomenology because of its suitability to explore human experiences of complex phenomena. This method involves analyzing and reflecting on participants' life experiences in order to gain a deeper understanding of their subjective perceptions, interpretations, and understandings (Annells, 1996).

In this study, the COREQ (Consolidated Criteria for Reporting Qualitative Research) checklist is applied to follow the EQUATOR guidelines for reporting research. This is a 32-item checklist for reporting interviews and focus groups systematically. The checklist provides researchers with a framework for reporting key study design, data collection, and analysis aspects, fostering clarity and reproducibility. The criteria also cover various aspects of qualitative research, including data collection methods, participant recruitment, and analysis processes. Furthermore, following established reporting guidelines facilitates peer review by providing standardized criteria for assessing the validity and quality of qualitative research. In reporting qualitative research, the COREQ checklist emphasizes ethical considerations, such as ensuring participant privacy and providing a clear ethical rationale. Ultimately, adopting EQUATOR guidelines further improves qualitative research reporting standards, as well as improving qualitative research practices more broadly (Hope & King, 2022).

### Participant selection

This study included participants who got pregnant after being diagnosed with infertility and agreed to participate in interviews. Researchers recruited participants from pregnant women who had experienced infertility and attended the Sakarya Training and Research Hospital's perinatal clinic between November 2022 and May 2023. The interviewer, who was a registered midwife, obtained patient information from the hospital's electronic medical records system. In order to recruit participants, A phone call was initially made to inform and gain permission from the participants, and then appointments were scheduled at convenient times and dates using social media and messenger applications such as WhatsApp and Telegram. Interviews took place in a quiet consulting room at the hospital, allowing open and honest communication. Interviews were conducted without the presence of other participants or researchers in order to preserve privacy and confidentiality. In this way, participants were able to share their experiences without concern for their privacy. Participants under 18 years of age and participants who withdraw from the study during the interview are excluded from the study. The registered midwife contacted 20 mothers initially and invited them to participate in the study. One mother declined participation due to her husband's objection.

Another mother cited privacy concerns as the reason for her non-participation. A third mother commented that her pregnancy period was challenging and she wished to forget it. The fourth mother moved to a different hospital and the final mother relocated to a different city in the second trimester. In this study, a comprehensive amount of data was collected and data saturation was deemed sufficient by the authors. A total of 15 mothers participated in the study. The interviews began with open-ended questions such as “How would you describe yourself before and after pregnancy?”, “How has the diagnosis of infertility affected your perspective on pregnancy?”, “How do you evaluate your relationship with your partner after becoming pregnant?”.

### Setting

Pregnant women who experienced infertility and attended Sakarya Training and Research Hospital’s perinatal clinic between November 2022 and May 2023 were participants in the study. The interviews were conducted without the presence of any other participants or researchers.

### Data collection

An in-depth interview was conducted with participants using a sociodemographic form, semi-structured interview form, and a TSCO audio recording device (Model no. TR906, Made in China). A written consent was obtained from participants before the interview and recording. The demographic characteristics of the participants were collected from the patients face-to-face in a quiet consulting room at the hospital. The interview took place during a period when patients were visiting the hospital for routine pregnancy check-ups. We decided on this for patient convenience and time efficiency. Audio recording permission was also obtained before the interviews began from the participants. In order to eliminate hesitation about the study and to encourage the interviewees to answer the questions honestly, the researcher explained to each interviewee that they would be assigned a number based on their order in the interview. After the interview, notes were taken while listening to the recordings. After obtaining written consent, completing sociodemographic forms, and scheduling face-to-face sessions, approximately 25–30-minute interviews were conducted. In qualitative research, the sample size is determined by the concept of data saturation. Data saturation occurs when no new information or themes emerge from the data, indicating that the sample size is adequate (Francis et al., 2010). According to our study, themes and insights recurred as the interviews progressed, indicating that the desired themes were thoroughly explored. Data saturation

was considered sufficient in the study as all desired themes were adequately explored, and a comprehensive amount of data was collected.

### Data analysis

In the study, two researchers contributed as data coders. The data was coded through thematic analysis to form related themes based on the document’s content. In qualitative data, themes can be identified, analyzed, and interpreted through thematic analysis. It emphasizes the active role of the researcher in the process of coding and theme development. Researchers organize and report their analytical observations using themes and psychiatrists are using these versions due to their greater flexibility (Clarke & Braun, 2017). Ultimately, 15 codes were determined along with four themes. The corresponding author (Ph.D. candidate) and second researcher (Ph.D.), who were experienced in analyzing qualitative data, classified and identified codes and themes through the study content. The first three authors of this study were female, and the last author was male. All of the authors have considerable experience in infertility and pregnancy and a keen interest in filling a gap in infertile women’s mental health during pregnancy. In the study, the themes were derived from the data rather than being predetermined, and through researchers’ analysis of participants’ responses and experiences, themes emerged initially. A MAXQDA Analytics Pro 2020 program was used to manage the data in this study.

### Rigor and trustworthiness

The data’s trustworthiness was assessed based on the suggestions of Guba and Lincoln (Cypress, 2017; Guba & Lincoln, 1981). A trustworthiness concept can be categorized into credibility and dependability. The concept of credibility corresponds roughly to the concept of internal validity as defined by positive ideologues, while that of dependability corresponds to the concept of reliability. In terms of reliability, transferability, which is external validity, and confirmability, which relies mostly on presentation (Gunawan, 2015). The phenomenological approach was used in our study as a qualitative research design to verify the study’s credibility (Rodriguez & Smith, 2018). The last researcher, who was an obstetrics and gynecologist and specialized in infertility, reviewed the themes and verified the process’ accuracy. The concept of transferability is traditionally associated with the application or generalization of findings to a wide range of situations. However, qualitative research emphasizes the richness and depth of insights rather than strictly transferring them into other contexts. By examining individuals’ experiences within a specific context,

qualitative research illuminates the intricacies and mechanisms underlying a phenomenon (Leung, 2015). Through member checking we allow participants to review and verify the findings as part of the research process.

Furthermore, we ensured that the findings were transferable and considered different viewpoints by incorporating multiple perspectives. In order to enhance the dependability of our data and ensure that our findings are accurate and reliable, we use an audit trail. In the audit trail approach, we tried to keep a detailed record of the research process, from decisions to data collection and analysis. A skilled researcher enhances the dependability of data through qualitative research principles, so we provided education courses with certificates for authors with little or no experience in qualitative studies. In order to enhance data confirmability, peer review strategies were used to ensure that the findings accurately reflect the participants' perspectives and experiences, as well as the researcher's interpretation, and enabled us to examine the data, analysis, and interpretation critically, ensuring the findings were trustworthy.

### Ethical consideration

This study was performed in line with the principles of the Declaration of Helsinki. Approval was granted by the Ethics Committee of Sakarya University on 05.10.2022 by the number E-71522473-050.01.04-171377-258. Informed written consent was obtained from participants before the interview and recording the voice, ensuring that they understood the study's purpose, procedures, risks, benefits, and confidentiality. All participants were informed that they had the right to withdraw from the research at any time without consequence.

## Results

The demographic analysis revealed that the participants were between the ages of 22 and 38, with a mean age of  $30.33 \pm 4.19$ . There were 15 women; three graduated from universities, five from high schools, three from secondary schools, and four from primary schools. Eleven women were housewives, three were civil servants, and the remaining one was a family physician. The median duration of infertility was 3.73 years, ranging from 1 to 10 years. All participants except four mentioned female factors as a cause of infertility. One participant had both male and female factors. Two participants mentioned a malefactor, and another mentioned unexplained reasons. Regarding infertility treatment, seven participants got pregnant through IUI, and eight got pregnant through IVF. Some demographic characteristics of the participants are shown in Table 1.

Mothers' perspectives on emotional challenges during pregnancy after infertility revealed four themes and 15 codes: (1) Over Emotional Burden, (2) Overprotection, (3) Overthinking, (4) Social Activity Changes. Figure 1 shows the coding tree.

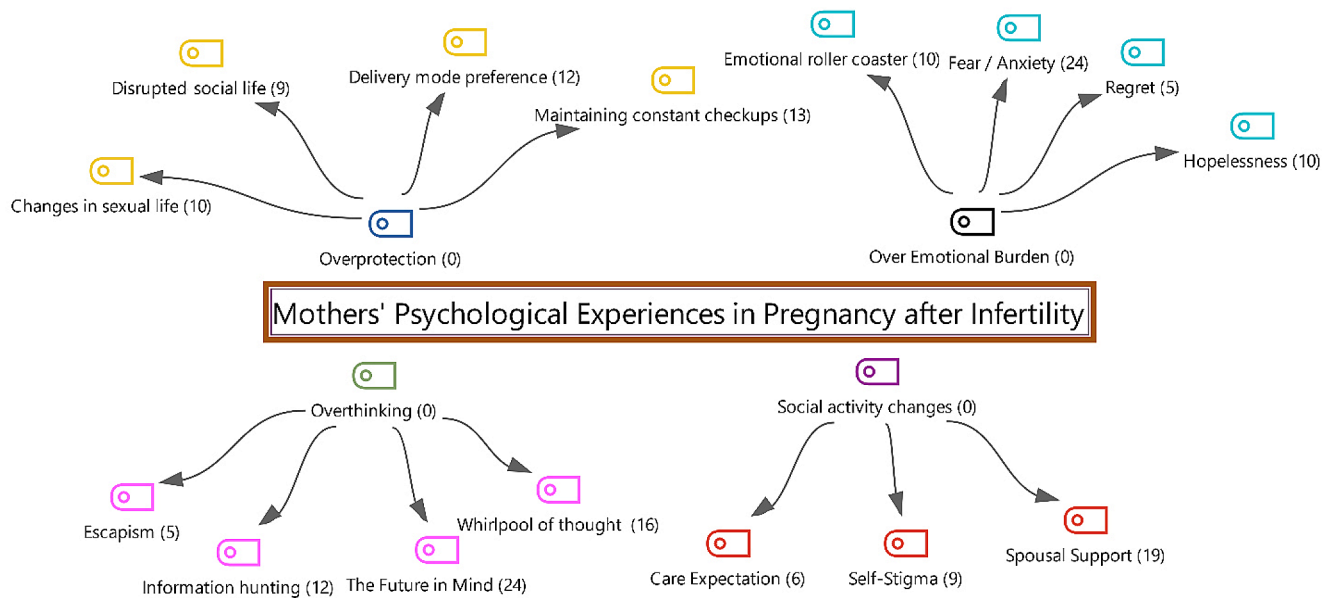
### Theme 1: Over Emotional Burden

An infertility diagnosis can continue to impact the emotional well-being of the couple after pregnancy, making the perinatal period even more challenging. Pregnancy after experiencing infertility can be a journey filled with a complex combination of emotions, almost like a roller coaster ride of emotions. In the present study, pregnant women with a history of infertility reported intense emotional burdens,

**Table 1** Demographic characteristics of the participants

Participant	Age	Education	Occupation	Yearly Marriage Duration	Duration of infertility	Cause of infertility	Type of infertility treatment
P 1	33	Primary School	Housewife	2 years	1 year	Female	IUI*
P 2	29	High School	Housewife	2.5 years	1 year	Female	IUI
P 3	29	University	Physician	3 years	1 year	Female	IVF*
P 4	35	Primary School	Housewife	8 years	4 years	Female	IUI
P 5	28	Secondary School	Housewife	3 years	2 years	Female	IUI
P 6	22	High School	Housewife	3 years	1 years	Female	IUI
P 7	25	High School	Civil servant	5 years	2 years	Male	IVF
P 8	31	High School	Housewife	6 years	4 years	Female	IVF
P 9	30	Secondary School	Housewife	13 years	6 years	Female	IVF
P 10	27	Primary School	Housewife	5 years	2 years	Female	IUI
P 11	34	University	Civil servant	8 years	7 years	Female & Male	IVF
P 12	30	Primary School	Housewife	5 years	3 years	unexplained	IVF
P 13	35	University	Civil servant	10 years	8 years	Female	IVF
P14	28	High School	Housewife	6 years	4 years	Male	IUI
P15	38	Secondary School	Housewife	20 years	10 year	Female	IVF

\*IVF: In Vitro Fertilization, \*IUI: Intrauterine Insemination



**Fig. 1** Coding tree of the mothers' psychological experiences in pregnancy after infertility

including Emotional Roller Coaster, Fear, Anxiety, Hopelessness, and Regret.

#### a. Emotional Roller Coaster

The roller coaster represents mothers' unpredictable emotional ups and downs. Consequently, they feel overwhelmed and incapable of coping with their emotions. The emotional roller coaster women experience post-infertility is complex. An initial feeling of happiness and excitement can quickly turn into anxiety and uncertainty after a successful pregnancy.

"I am moving through some ups and downs emotionally. Actually, I express my emotional state to my husband a little bit, but he manages me well, thanks to him. Sometimes, I cry for no reason; sometimes, I get angry. Things happen momentarily." (P1, female factor, 1-year infertility)

"Pregnancy was both a dream and a nightmare for me." (P4, female factor, 4-years infertility)

#### b. Fear / Anxiety

It is common and understandable for women to feel fear and anxiety during pregnancy, especially following an infertility diagnosis. There may be a fear of miscarriage, preterm birth, or other complications that women experience during pregnancy, intensified by the memories of previous struggles. The women who participated in the current study stated that they often experience disappointment and uncertainty during pregnancy.

"In the early stages of my pregnancy, I was filled with fears and worries. I was afraid of miscarriage first, then ... " (P13, female factor, 8-years infertility)

"During the early stages of my pregnancy, I was very anxious. It was a fear in my mind to have a fake pregnancy." (P3, female factor, 1-year infertility)

#### c. Hopelessness

Hopelessness after long infertility treatment is a complex and reasonable emotional response in infertile couples. Many couples struggle with infertility for months or even years with repeated medical interventions and emotional challenges.

"I always thought pregnancy was impossible and unachievable for a long time." (P13, female factor, 8-years infertility)

"There were many difficult experiences for me during infertility treatments, especially waiting in infertility clinics, which were emotionally draining for me. There were pregnant patients waiting in the reception hall. When I saw them, I thought it would never happen to me to be a mother." (P9, female factor, 6-years infertility)

#### d. Regret

The experience of pregnancy may cause regret after years of infertility struggle. There are many factors that can contribute to regret, and it is a deeply personal emotion. It may result from a sense of lost control over one's reproductive

journey or from the impact it has had on one's family and relationships.

“The first few months, I was constantly suffering from illness. I thought I would never recover, and I just wanted to deliver as soon as possible. Even I asked myself, what did we do? I was certain it would not pass. My health isn't that bad, but it was quite bad.” (P2, female factor, 1-year infertility)

## Theme 2: Overprotection

Overprotection is a natural reaction to the possibility of losing something that was so highly desired and hard-earned. When a mother experiences infertility, balancing motherhood and safeguarding pregnancy could be challenging and may lead to overprotection during pregnancy. In this study, this phenomenon is displayed in various aspects, including impacting changes in sexual life, delivery mode preferences, disruptions in social life, and an insistence on maintaining constant check-ups. It is imperative to recognize and address these feelings by healthcare providers to ensure a successful transition to pregnancy and a healthy psychological state.

### a. Changes in Sexual Life

A pregnancy after struggling with infertility can significantly affect a couple's sexual life. A shift in women's sexual behaviors is often accompanied by a tendency to overprotection due to fears of potential complications.

“I don't have a sexual life anymore. As soon as I learned I was pregnant, my husband would not even touch me.” (P4, female factor, 4-years infertility)  
 “I am afraid of causing harm to the baby, so we don't want it at all. It is fear, not reluctance, that makes us avoid sexual activity.” (P2, female factor, 1-year infertility)

### b. Delivery Mode Preference

Delivery mode preferences should be based on medical advice and individual circumstances. However, for couples who have experienced infertility, overprotection thoughts can influence their decision-making process. It is imperative to understand the reasons behind preferences and provide comprehensive information during the prenatal period. This will assist couples in making an informed decision.

“I am insistent on a cesarean section because I'm afraid something will happen during labor and harm the baby.” (P15, female factor, 10-years infertility)

### c. Disrupted Social Life

Experiencing a pregnancy after infertility can change one's social life. Transitioning from infertility to pregnancy can also introduce new dynamics and challenges in social interaction, while the entire experience can be isolating in itself.

“Pregnancy left me socially withdrawn.” (P13, female factor, 8-years infertility)

“Fear of abortion prevented us from having a normal social life during pregnancy. I always had to rest in bed. Consequently, we were socially isolated.” (P8, female factor, 4-years infertility)

### d. Maintaining Constant Check-ups

Couples who experience pregnancy after long-term infertility often maintain continuous perinatal check-ups due to overprotective thoughts and a desire for early detection of potential complications. Anxiety and cautiousness can often increase among women who have struggled with infertility, fearing something unexpected may occur during pregnancy.

“In the first trimester, the doctor told me there might be something wrong with his heartbeat, so I tried to schedule an appointment with another doctor that day or sooner, but I couldn't find an appointment, so I went to a private hospital right away.” (P2, female factor, 1-year infertility)

“My perinatal care and follow-ups are carried out in two private hospitals, a state hospital, a city hospital, and a university hospital. In other words, I visit for perinatal check-ups in five different hospitals to ease my anxiety and heightened concern. I also remembered that I visited different doctors three days in a row.” (P1, female factor, 1-year infertility)

## Theme 3: Overthinking

For many couples struggling with infertility, overthinking during pregnancy is a common phenomenon. The long-term process of infertility treatment and its low success rate often results in considerable uncertainty, disappointment, and anxiety, which can continue to develop during pregnancy and cause mental overload.



#### a. Escapism

In psychology, escapism is the act of removing oneself from issues, stress, or discomforts in the present moment. A number of effective strategies were used by the women in this study.

“I did a lot of knitting, quilting, and embroidery. I was always excited, and I needed to distract my thoughts.” (P15, female factor, 10-years infertility)

#### b. Information Hunting

In this study, the process of seeking knowledge, guidance, and reassurance during pregnancy after infertility is known as information hunting.

“During my pregnancy, I downloaded all available pregnancy programs, consulted friends who were pregnant or had delivery experiences, and consulted medical professionals” (P11, female & male factors, 7-years infertility)

“I did a lot of research on the internet about my pregnancy. I even burned my food because of it. My close friends also gave me advice....” (P6, female factor, 1-year infertility)

#### c. The Future in Mind

A woman who overcomes infertility and gets pregnant experiences different emotions. Eventually, her fears of losing the pregnancy turn into joy and hope. The mother began to dream about a future with the baby she had been expecting for so long.

“The baby’s coming makes us happy; our happiness depends on our baby. I am very happy and excited. At some point after all these years, I’d like to hear a baby crying at home. The scent of the baby is what I want to smell.” (P5, female factor, 2-years infertility)

“I want to cuddle my baby as soon as possible and put her to sleep with me. Spending time with my baby and going for walks together is what I dream of all the time.” (P4, female factor, 4-years infertility)

#### d. Whirlpool of Thought

In this study, the whirlpool of thought does not just refer to the feelings that mothers experience during pregnancy but also the overwhelming thoughts they deal with.

“As time went on, I got more and more worried, and the little things started to affect me very much.” (P7, Male factors, 2-years infertility)

“My priorities changed even while the fetus was still in my abdomen. I became more nervous, and I feared the baby would not move. Everything was planned around the baby.” (P11, female & male factors, 7-years infertility)

### Theme 4: Social Activity Changes

For the expecting mother, pregnancy after infertility can cause a variety of social changes. During pregnancy and motherhood, she experiences profoundly personal and emotionally stressful moments.

#### a. Care Expectation

An expectant mother has unique expectations when it comes to pregnancy after infertility. During this precious time of infertility, the woman may have heightened emotional and physical needs.

“It would be great to have my mom and husband with me during pregnancy.” (P12, unexplained, 3-years infertility)

“In infertility and during pregnancy, you only need attention and thank God my husband was always by my side.” (P11, female & male factors, 7-years infertility)

#### b. Self-Stigma

An unconscious negative belief or feeling of a woman about her infertility process and pregnancy may lead to self-stigma at the time.

“I felt a sense of responsibility towards my husband since I was the one with the infertile factor and responsible for our infertility. I thought I wouldn’t have any chance of getting pregnant.” (P6, female factor, 1-year infertility)

“For a long time prior to becoming pregnant, I felt inadequate and useless in many aspects of my life. Our past difficulties during the infertility treatment process really exhaust me, I think.” (P13, female factor, 8-years infertility)

#### c. Spousal Support

Spouse support is imperative to navigating from infertility to a pregnancy process. In this study, most women reported their husbands supported them financially and emotionally during pregnancy.

“My husband liked me much better and started paying more attention to me after getting pregnant. Thank God, he helped me with house chores and didn’t make me tired doing them.” (P4, female factor, 4-years infertility)

“My husband is the most supportive person in my life. I may have talked a lot about him, but he really is my biggest supporter. I feel stronger when he is beside me; he is my source of strength.” (P1, female factor, 1-year infertility)

## Discussion

In this study, participants stated that they experience a variety of mixed emotions, which lead to a feeling of overwhelming following infertility treatment and during pregnancy. Our study identified four dominant themes: Overemotional Burden, Overprotection, Overthinking, and Social Activity Changes. Our results show that, pregnancy after long-term infertility treatments often results in roller-coaster emotions, fear, anxiety, and hopelessness in mothers. According to mothers’ reports, moments during pregnancy they caused mothers anxiety in different trimesters. They also mentioned feeling relieved and emotionally inspired by becoming mothers. The study conducted by Bovin et al. in 2023 showed that approximately 12% of women with infertility mentioned the words anxious and worried, and 8% mentioned disappointment as the most frequent words to describe their feelings even after pregnancy (Boivin et al., 2023). Swanson et al. in 2021 also describe the infertility process as full of a roller coaster of emotions and feelings. It is described that the infertility treatment process is characterized by a period of sadness and grief, followed by some renewed sense of hope after getting successful results (Swanson & Braverman, 2021).

According to our study, overprotection is reported as a common reaction among pregnant women during interviews. Fear of loss, a desire to safeguard, and long-awaited expectations of a baby can lead to overprotective attitudes, which are reflected in their sexual and social lives adversely and in the perinatal care process. It is also possible for such overprotection to impact the preferred mode of delivery to ensure the baby’s safety. In our study, mothers report decreasing or withdrawing from sexual activity during pregnancy due to fears that they may harm the baby, cause miscarriage, or adversely affect the pregnancy. Mothers also reported social isolation due to their fears of miscarriage or complications during pregnancy. According to our results, mothers need frequent medical check-ups and continuous monitoring to ensure their babies’ health

and detect potential complications early to protect their fetuses. According to a study conducted by Fukui in 2021, mother-to-infant bonding scores were positively related to perceived maternal overprotective attitude in late pregnancy (Fukui et al., 2021). However, a study conducted by Ohara in 2018 showed that excessive overprotection sense during pregnancy could be determined as a cause of bonding failure during pregnancy. When a mother exhibits overprotective behavior during pregnancy, she generally spends more time in the caring process. As a result, she may not have enough time to establish a motherhood role during pregnancy (Ohara et al., 2018). A study conducted by Phan et al. in 2021 reported that approximately 30% of pregnant women had no sexual activity during their pregnancy. Pregnant women in this study were most concerned about infection and damage to the fetus (Phan et al., 2021).

In our study, pregnant women described adverse changes in their social life which introduce new dynamics and challenges to their social interaction. A study conducted in 2016 by Velikonja et al. reported that women who get pregnant with assisted reproductive technologies are more likely to be socially marginalized. They also reported greater positive emotions and greater life satisfaction as the pregnancy progressed despite experiencing more medical challenges during the pregnancy (Velikonja et al., 2016).

According to our results, mothers experiencing pregnancy following long-term infertility tend to choose delivery modes based on their overprotective attitudes. In 2015, Reichelt et al. reported that the Cesarean rate was significantly higher in pregnancy after infertility than in spontaneous pregnancy compared to 20 years ago (Reichelt et al., 2015). A study by Chien et al. in 2015 reported that infertility treatment significantly influences mothers’ decisions about delivery modes. They also found that women who get pregnant with the In vitro fertilization method (IVF) may consider their fetus to be more vulnerable, and a cesarean delivery may be considered a low-risk method for the baby’s safety (Chien et al., 2015).

Overthinking in this study highlights how women who experience infertility always struggle with pregnancy-related thoughts. During the infertility treatment period, women may experience uncertainty, disappointment, and anxiety several times. This condition can even cause psychological overload and mental exhaustion during pregnancy. Mothers in our study mentioned doing handicrafts such as knitting as a way to escape overthinking. Pedro, in 2015, identified escapism as a successful strategy for avoiding overthinking regarding infertility, pregnancy, and delivery in infertile women. Infertile women in this study describe escapism as a way to avoid thinking about anything else except their activities (Pedro, 2015). In our study, mothers mentioned they are always in the middle of information



hunting online, in person, or consulting resources, even for the most straightforward pregnancy-related questions. A study conducted by Brochu et al. in 2019 reported that approximately 90% of infertile individuals surf the internet for information about infertility treatment processes and attempt to find more mental and medical support (Brochu et al., 2019). We believe that overthinking during pregnancy can be calming and exciting, especially when dreaming about the baby. However, when it is exaggerated, it can lead to overwhelming stress and anxiety in mothers. Mothers in our study shared their most precious dreams of holding their new baby after a challenging infertility journey. In our study, it was observed that most infertile couples think about their future with their expected baby at least once a day.

Pregnancy after infertility results in various social changes for women (Boulet et al., 2017). A woman's emotional experience of infertility and her various concerns and experiences during pregnancy adversely affect her mental health and contribute to the stigma attached to infertility (Zargar et al., 2023). In our study, women with female factor infertility often suffer from self-stigma and low self-esteem. According to Lin et al. in 2020, women who experience infertility suffer from low self-confidence and feeling inadequate, which results in self-stigma (Lin et al., 2022). In this study, mothers describe spousal support as an essential support system to overcome infertility challenges. In addition, they reported a higher level of mental support following pregnancy, as well as assisting with household chores and other daily activities. According to Choi et al. in 2023, spousal support significantly reduces stress levels in women with infertility. Women with a supportive husband are more likely to develop a more positive attitude towards infertility treatment and can also cope more effectively with infertility challenges (Choi & Moon, 2023).

## Limitations

The study has limitations, despite providing valuable insight into women's emotional challenges after infertility. The small sample size limits generalizability of results, since qualitative research inherently cannot be generalized to a broader population. Additionally, a stratified thematic analysis based on factors such as age group, education level, cause of infertility, and number of previous attempts was not feasible due to the high level of variability among the women included in the study. A more nuanced understanding of the diverse experiences would have been possible. A qualitative study involving spouses, family members, and healthcare professionals can provide valuable insight into the emotional challenges pregnant women face after infertility from multiple perspectives. A better understanding

of the complexities of this experience could lead to more comprehensive support systems and interventions to help women who are experiencing these emotional challenges.

## Conclusion

Pregnancy after infertility is a unique and emotionally charged experience for women, encompassing a spectrum of feelings that can be difficult to express. Our study results show four dominant themes which illustrate women's complex emotional experiences and coping strategies during pregnancy. In this study, Over Emotional Burden, Overprotection, Overthinking, and Social Activity Changes were mentioned as the most common psychological concerns during pregnancy after infertility. Study results suggest health-care providers who interact directly with pregnant women should be aware of these emotional burdens to understand mothers better and counsel them more effectively. Midwives, psychologists, and psychiatrists should also be more attentive to mothers' emotions and provide coping mechanisms. This will enable mothers to experience their pregnancy with fewer possible adverse effects on both mother and fetus. However, research on infertile women's emotional reactions and mental reactions during pregnancy is still limited. It may result from infertile mothers often concealing their emotions, ideas, and beliefs during pregnancy because they sacrifice themselves for the expected baby. This study can provide a starting point for further qualitative and quantitative studies on the psychological burden of pregnant women who experience infertility for a long time.

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Data collection: GB.

Data analysis: PHB, YHB.

Study supervision: YHB, ASC.

Manuscript writing: PHB, YHB.

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**Data availability** The data supporting the findings of this study are available upon reasonable request.

## Declarations

**Conflict of interest** No conflict of interest has been declared by the authors.

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